

## RS-485 Option Unit for TOSVERT VF-S7

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### Operation Manual

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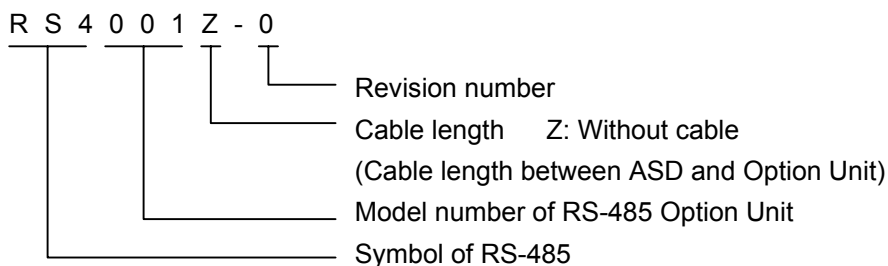
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This option is available only for VF-S7 series adjustable speed drives (ASDs) whose CPU is V103 or higher. Communication does not work with versions V100~V102. Be sure that your ASD contains at least V103 CPU software.

## Introduction

Thank you for purchasing the “RS-485 Option Unit” for Toshiba’s TOSVERT VF-S7 series ASD. Read the safety precautions in the **VF-S7 Instruction Manual** before powering up your VF-S7 unit. The S7 series has a built-in serial communication port. Using this RS-485 Option Unit, the ASD and a peripheral device such as a computer or PLC can communicate with each other. Please read the entire manual carefully before attempting to control your VF-S7 via RS-485 serial connection. Besides this operation manual, the “**Serial Communications Option Manual**” is needed to develop software which communicates with the VF-S7.

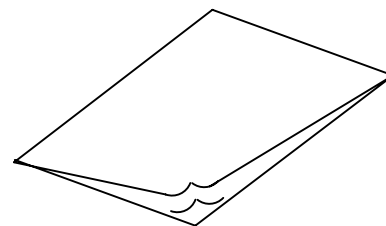
[Explanation of part number of RS-485 Option Unit]



[Check of accessories]

The RS-485 Option Unit is shipped together with the following accessories in the same package. On opening the packing case, check to see if the following accessories are contained or not.

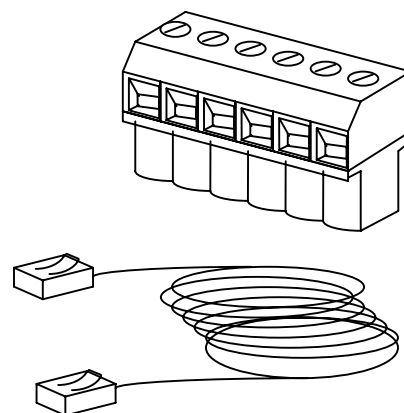
(1) Operation manual of RS-485 Option Unit.....1 copy



(2) Connector terminal (remover side).....1 pcs  
(MVSTBW2.5/6-ST-5.08 : Phoenix Contact)

(Note) The RS-485 Option Unit (Part Number : RS4001) is not provided with connection cable between the VF-S7 ASD and Option Unit. This should be purchased separately.

Part number of connection cable between the VF-S7 ASD and Option Unit	Cable length
CAB0011-0	1m (1.2m, 4ft)
CAB0013-0	3m (3.6m, 12ft)
CAB0015-0	5m (4.8m, 16ft)



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## Carefully read the following notes





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### Safety precautions




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There are warnings and cautions appearing on the ASD and in its operation manual. Carefully read those warnings and cautions because they are very important not only for safe and correct operation but also for preventing the equipment and operators from getting damaged or injured. After reading the operation manual of the ASD carefully with understanding of every note for safety, read this operation manual for carrying out connection and operation of the equipment correctly.

#### GENERAL PRECAUTIONS



 <b>DANGER!</b>	
 NEVER DISASSEMBLE	? Never disassemble, remodel or repair the product. Not following this instruction could cause electrocution, fire or injury. Repair should only be performed by authorized service centers.
 PROHIBITED	? Never put or insert any objects (cable scraps, rods, wires, etc.) into the ASD and the Option Unit. Not following this instruction could cause electrocution or fire. ? Do not splash water or liquid onto the ASD or the Option Unit. Not following these instructions could cause electrocution or fire.
 MANDATORY	? Whenever making wiring connections or setting the switch, be sure to turn all power to all related units off. ? If the ASD or the Option unit produces smoke, odor or abnormal noises turn off the input power immediately. Using the ASD or the Option unit in such a condition could result in a fire.

#### CAUTIONS ON TRANSPORTATION AND INSTALLATION



 <b>DANGER!</b>	
 PROHIBITED	? Do not operate the unit, when loose, broken, bent or otherwise damaged parts are found. Not following this instruction could cause electrocution or fire. Repair should only be performed by authorized service centers. ? Never install the unit in a place exposed to flammables, as this could cause a fire. ? Never install the unit in a place where water or liquid is splashed onto it, as this could cause electrocution or fire.
 MANDATORY	? Use the unit under the environmental conditions specified in the instruction manual, otherwise malfunctions or troubles could result.

 <b>CAUTION!</b>	
 PROHIBITED	? Avoid installation locations that may be subjected to large shocks or vibrations, otherwise the unit could fall and cause injury.

## CAUTION ON OPERATION

 <b>DANGER!</b>	
 PROHIBITED	? Do not wipe the unit with wet cloth. Not following this instruction could cause electrocution. ? Do not pull the communication cable, otherwise malfunctions or troubles could result.

## CAUTION ON DISPOSING OF OPTION UNIT

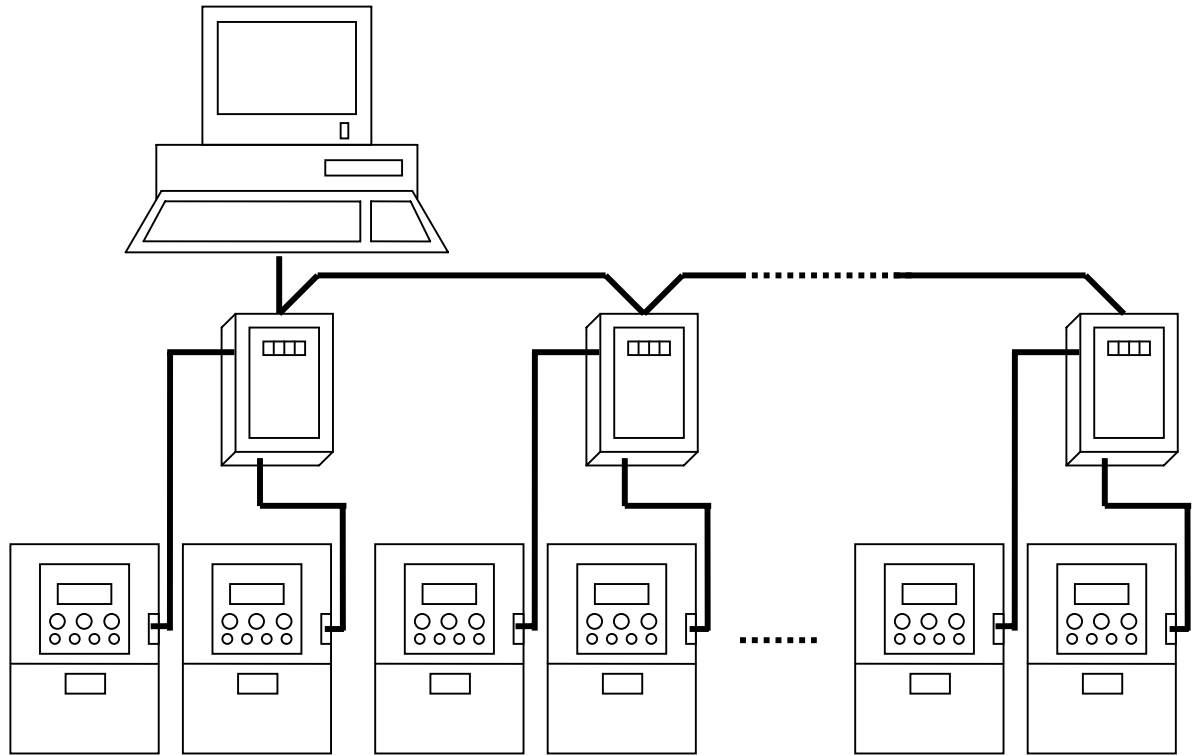
 <b>CAUTION!</b>	
 MANDATORY	? Dispose of the used unit as industrial waste. Not following this instruction could cause injury.

## Cautions on use

<b>CAUTIONS</b>	
	? Avoid installation locations that may be subjected to rapid changes in ambient temperature or/and humidity. ? Route the transmission cable separate from the ASD input/output power wiring. To avoid the possibly of electric shock due to leakage currents, always ground the ASD unit's E/GND terminal and the motor. To avoid misoperation, do not connect RS-485 Option Unit's SHIELD terminal to either of above-mentioned grounds or any other ground. ? When disconnecting connection cable, make sure to hold its connector with care not to give unreasonable stress to the cable and the unit. Since connectors of optional cables have locking pawls for disconnection prevention at the ASD and the Option Unit, disconnect such a connector while pressing the pawl by finger for unlocking. ? Mount the Option Unit securely on the panel, otherwise it could fall and cause malfunction or breakdown. ? Connect an electromagnetic contactor or the like between the ASD and the power source to secure external control of emergency stop of operation. ? Do not assign the same ASD number to more than one ASD in the same system. ? The ASD's EEPROM has a life of 10,000 write cycles. Do not write to the same EEPROM address more than 10,000 times.

## 1. Overview

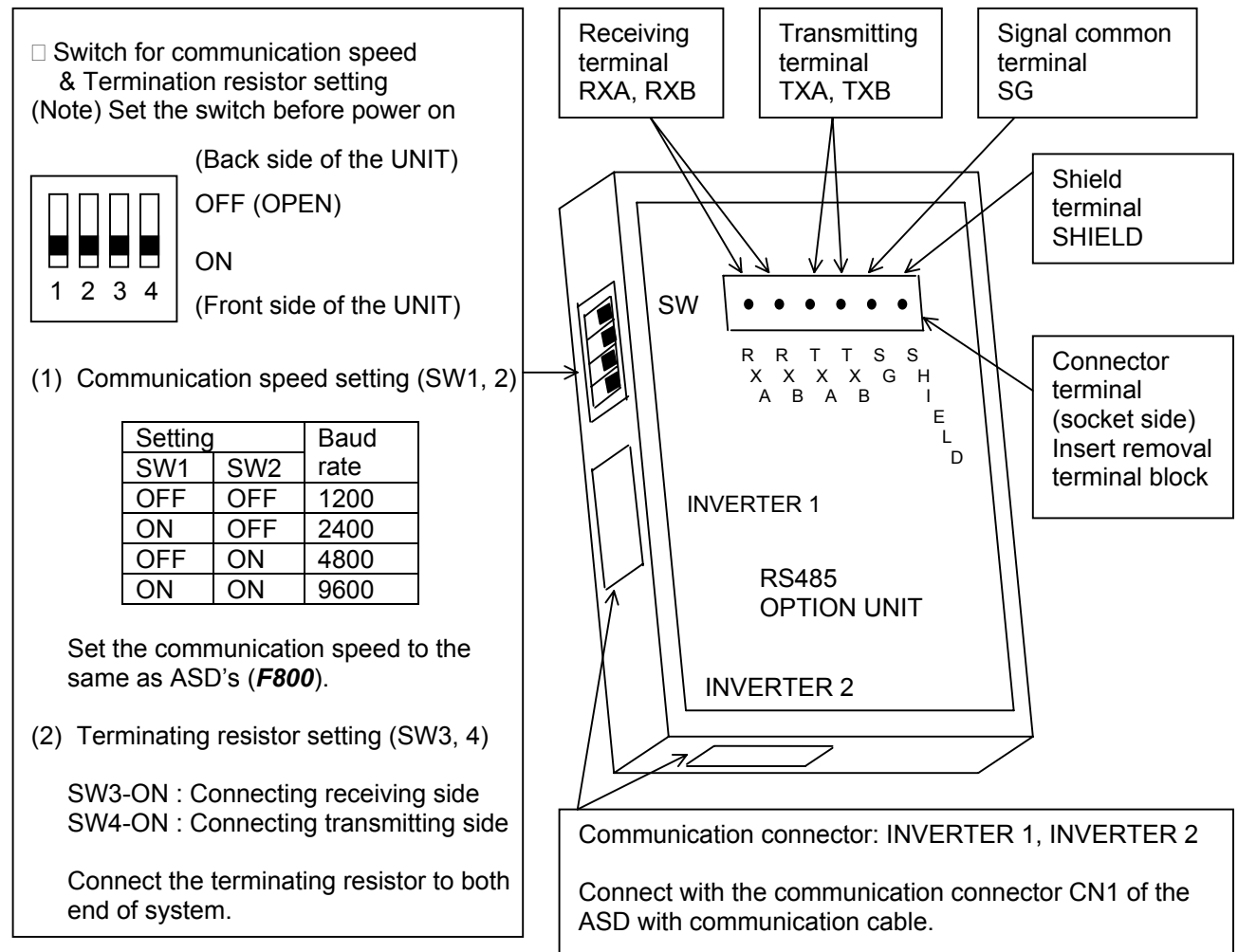
By using RS-485 Option Unit, a network can be constructed that allows communication between a host computer and multiple ASD units. A maximum of 32 Option Units can be connected on the same network. And two ASDs can be connected to one Option Unit. A maximum of 64 ASDs can be connected on the same network. (If ASD has a CPU whose version is V104 or V103, a maximum of 32 ASDs can be connected on the same network.)



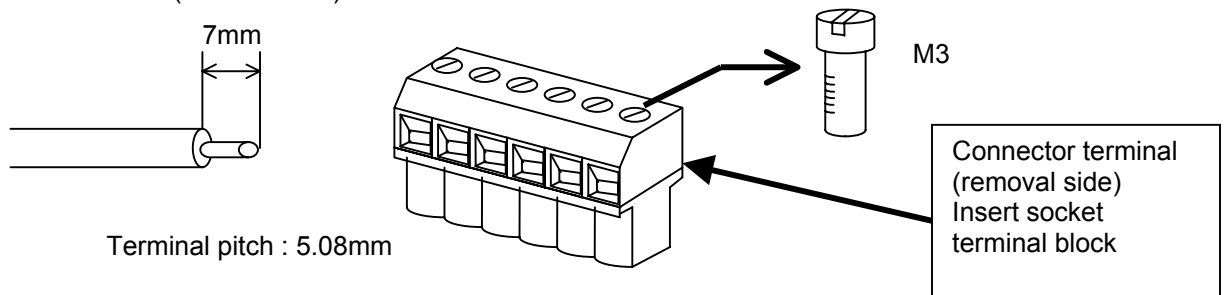
## 2. Communication specifications

Item	Specifications
Interface	Conforming to EIA RS485 standard
Configuration	4-wire, bus type (terminating resistor is necessary at each end of system)
Communication Distance	1,000m maximum
Connection Points	32 units maximum
Number of ASDs per one Option Unit	2 units maximum
Number of ASDs on the Same Network	64 units maximum (If ASD has a CPU whose version is V104 or V103, a maximum of 32 ASDs can be connected on the same network.)
Communication Line Isolation	Not isolated
Synchronization Method	Start-stop synchronization
Error Detection Method	Parity, checksum
Communication Speed	1200/2400/4800/9600 baud selectable (parameter and switch selection)
Data Code	ASCII code, binary code
Other	Time-out function available

## 3. Names and functions of main parts



□ Connector terminal (removal side)



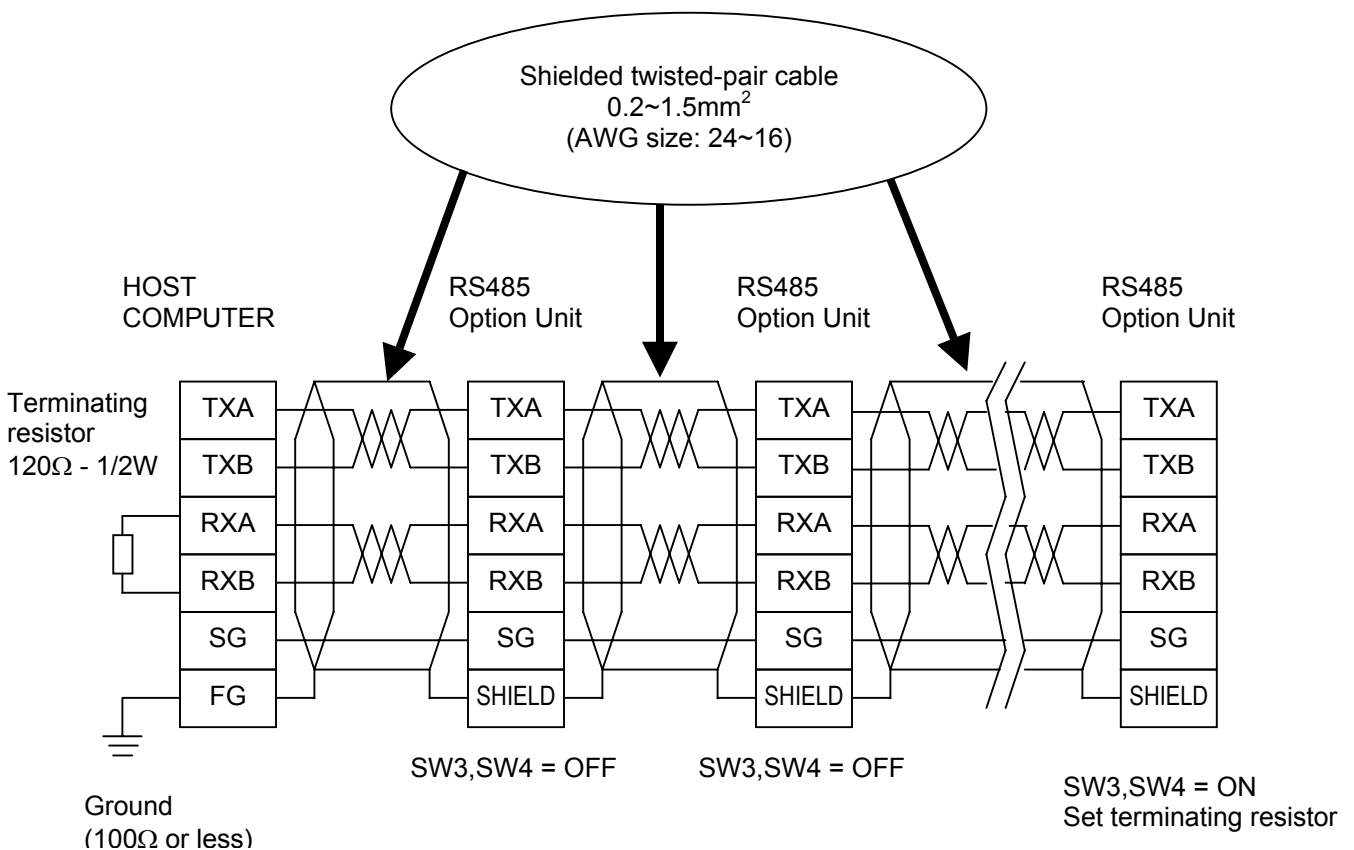
- Wire size (shielded twisted-pair cable recommended)  
Bare wire (without stick lug) :  $0.2 \sim 1.5 \text{ mm}^2$   
Phoenix Contact TWIN terminal : (wire size below)  $\times 2$   
Part number: AI-TWIN2 $\times$ 0.5-8WH, AI-TWIN2 $\times$ 0.75-8GY, AI-TWIN2 $\times$ 1-8RD, AI-TWIN2 $\times$ 1.5-8BK
- Removable terminal block  
COMBICON terminal blocks such as the Phoenix Contact TMSTBP series that allows signal branching can be used in place of included terminal.

## 4. Connection and start-up

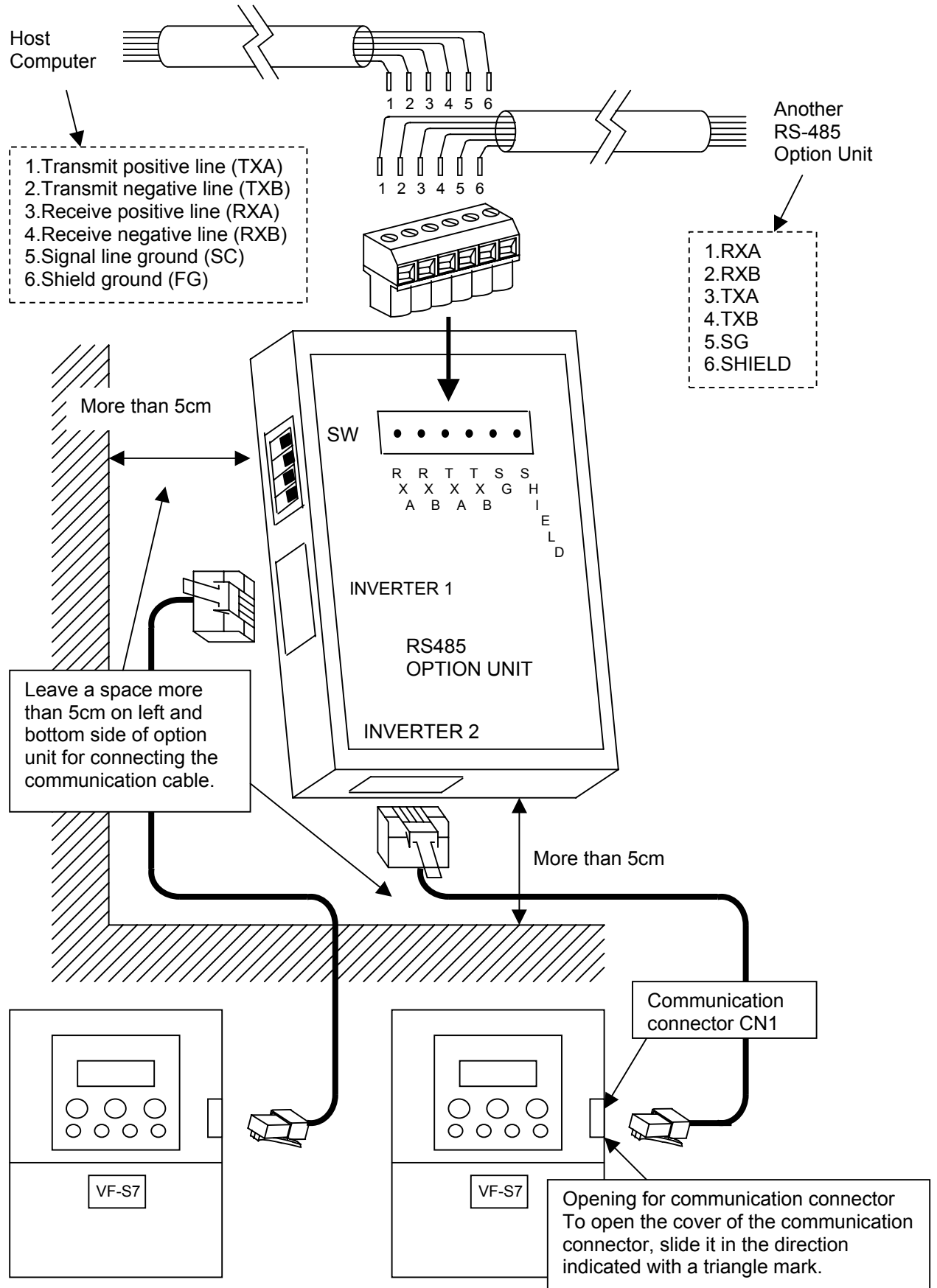
Connect the ASD with a host computer according to the procedure mentioned below.

### □ Procedure

- (1) Set the communication speed to SW on the RS-485 Option Unit.
- (2) Connect terminating resistor in both ends of units. The RS-485 Option Unit has internal terminating resistor. Set SW3 and SW4 to ON to connect these terminating resistors.
- (3) Install the RS-485 Option Unit on a metal panel.
- (4) Connect the cable to the removable terminal block. If the stick-lugs are not used, strip the insulation from the wire and insert the wire directly into the terminal. Be sure not to short any wires. Run the cable as shown in the figure. Use a common cable in the system.
- (5) Connect the shield of the twisted pair cable to the SHIELD terminal on each RS-485 Option Unit, and make the ground connection. Do not connect Host computer ground to a power ground or any other noise-producing ground connection.
- (6) Insert the removable terminal block back into the RS-485 Option Unit.
- (7) Connect the communication connectors (INVERTER1 and INVERTER2) of the RS-485 Option Unit to the communication connector (CN1) of the ASD with the optional cable.
- (8) Turn on the power of ASD.
- (9) Set the communication parameter of the ASD.



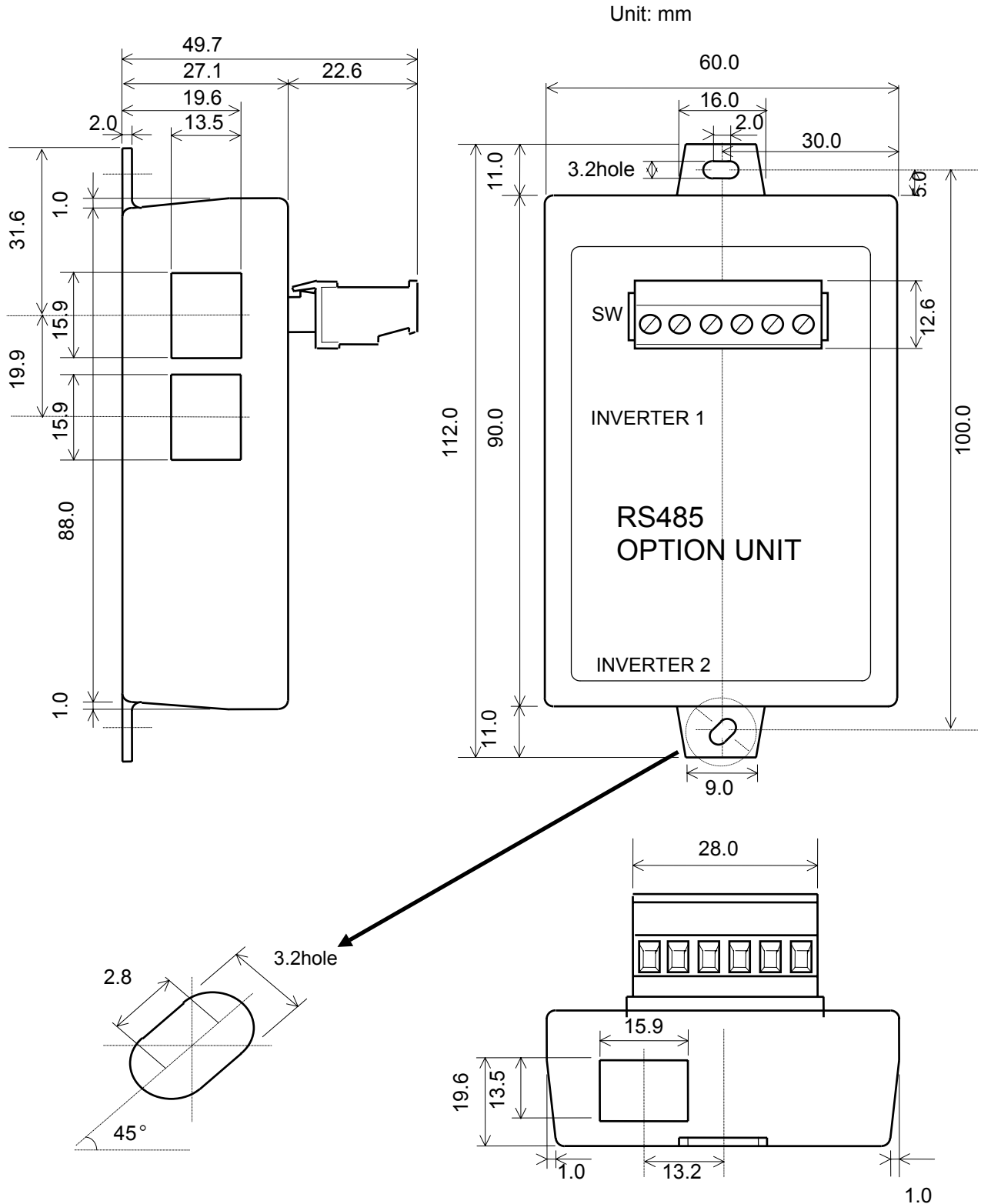
## □ Cable connection





## 5. Dimensions

Dimensions of the RS-485 Option Unit (with connector terminal (removal side)) are shown below.  
Make sure a space for connecting cables.  
Use M3 screws to install.



## 6.Communication parameters

Function	Parameter	Adjustable range	Default value
Communication speed	<b>F800</b>	0 : 1200bps 1 : 2400bps 2 : 4800bps 3 : 9600bps	3
Parity	<b>F801</b>	0 : NONE 1 : EVEN 2 : ODD	1
ASD number	<b>F802</b>	0~63 (0~31 in case that ASD has a CPU whose version is V104 or V103) Note) Do not assign the same ASD number to more than one ASD in the same system.	0
Communication error trip time(s)	<b>F803</b>	0~100 (0:OFF, 1~100)	0

## 7.Specifications

Item	Specifications
Part number	RS4001Z-0
Service environment	Indoors. Altitude of less than 1000m (3280 ft). Must not be exposed to direct sunlight, subjected to corrosive and/or explosive gases, vapor, dust, chips, cutting oil, grinding agent, etc.
Ambient temperature	From -10°C to +50°C (14°F to 104°F)
Storage temperature	From -25°C to +65°C (-13°F to 149°F)
Relative humidity	20 to 90% (no condensation allowed)
Vibration	5.9m/s <sup>2</sup> or less
Cooling system	Self-cooling

## 8.Warranty

The RS-485 Option Unit is covered under warranty for period of 12 months from the date of installation, but not to exceed 18 months from the date of shipment from factory. For further warranty or service information, please contact Toshiba International Corporation.